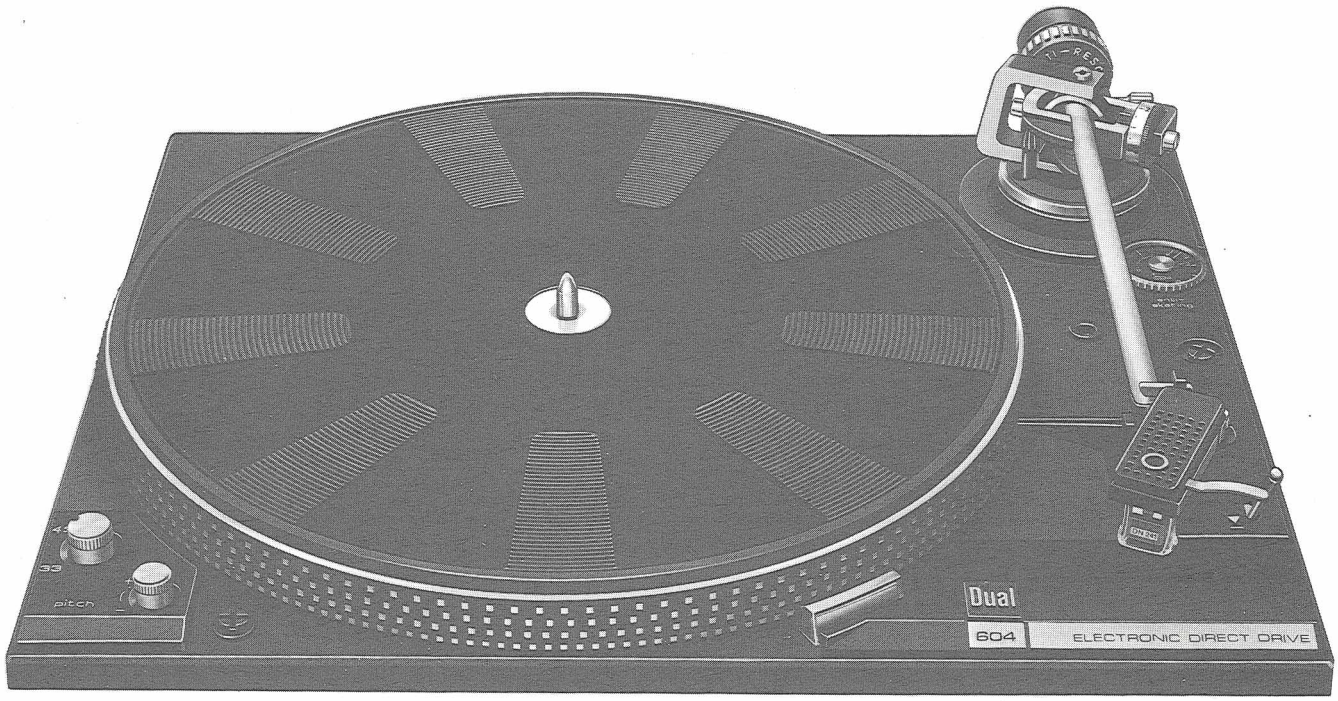
Dual

604

Edition February 1978



Service - Manual

Dual Gebrüder Steidinger · 7742 St. Georgen/Schwarzwald

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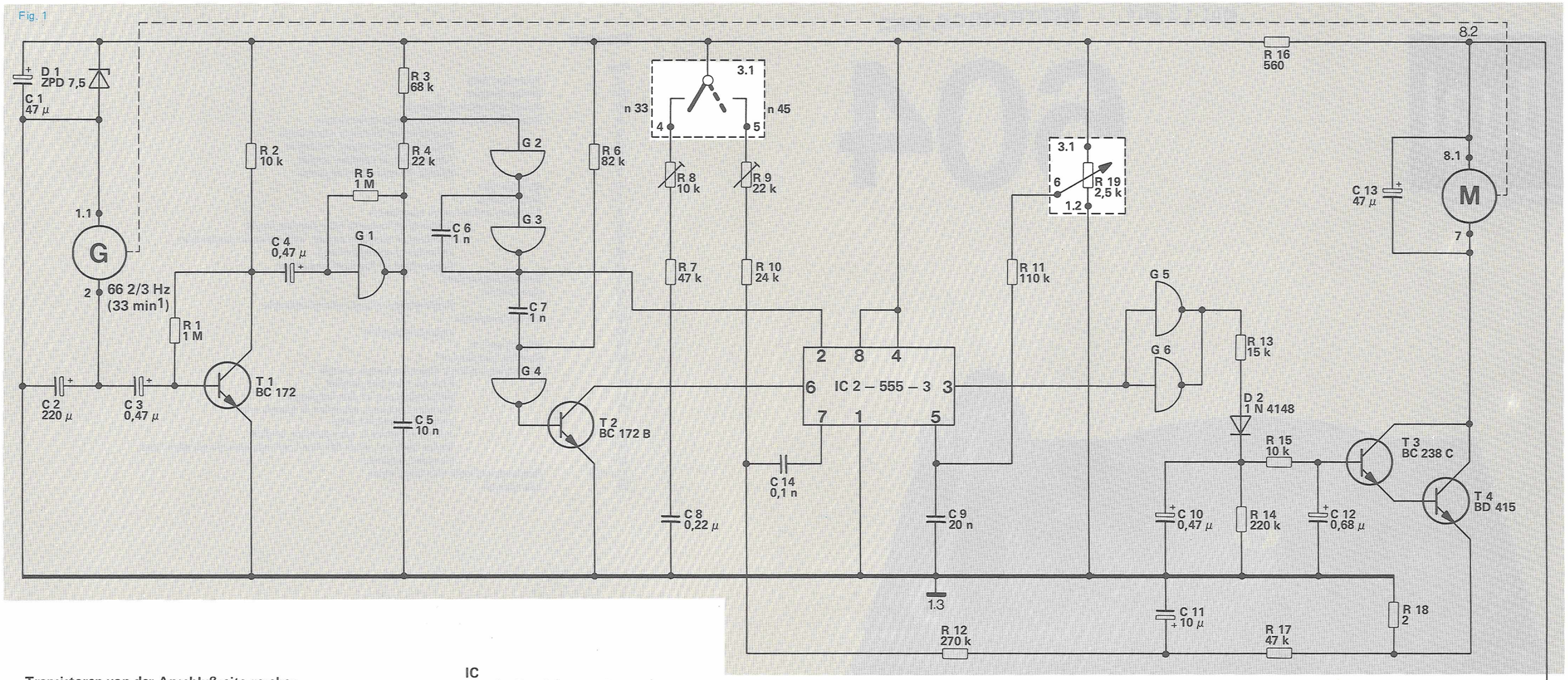
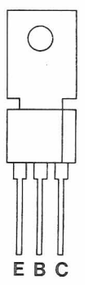
Technical data

Current	AC 50 to 60 Hz
Line voltage	110 to 125 V, 220 to 240 V
Drive	electronically-regulated direct-drive system, Dual EDS 500
Power input	approximately 2 watts, Motor at playing operation $<$ 50 mW
Power consumption	220 V 50 Hz: at start 25 mA 110 V 60 Hz: at play 15 mA at start 65 mA at play approximately 25 mA
Time from start to rated speed	2 – 2.5 s at 33 1/3 rpm
Platter	non-magnetic, dynamically balanced, detachable 1.3 kg, 300 mm diameter
Platter speeds	33 1/3 and 45 rpm, electronically adjustable
Pitch control	Separate for both speeds, each adjustable by means of variable resistor, with calibration scale; range of regulation: 10 %
Speed control (monitoring)	with illuminated stroboscope for platter speeds 33 1/3 and 45 rpm, adjustable to 50 or 60 Hz.
Sensitivity of the illuminated strobe (for 0.1 % speed deviation)	6 division markings per minute at 50 Hz, 7.2 division markings per minute at 60 Hz.
Total wow and flutter	according to DIN 45 507 (German Industry Standard) $<$ ± 0.06 %
Rumble (according to DIN 45 500)	Unweighted: $>$ 45 dB Weighted: $>$ 65 dB
Tonearm	Torsionally rigid tubular aluminum tonearm in low-friction four-point gimbal suspension, tonearm counterbalance with two mechanical anti-resonance filters.
Effective length of tonearm	222 mm
Offset angle	25° 20'
Tangential tracking error	0.16°/cm
Tonearm bearing friction	vertical $<$ 0.07 mN (0.007 g) horizontal $<$ 0.16 mN (0.016 g) (related to stylus tip)
Stylus pressure	from 0 to 30 mN (0 to 3 g) infinitely variable with 1 mN- (1/10 g) calibrations from 0 to 15 mN (0 to 1.5 g), operable from 2.5 mN (0.25 g) stylus pressure up.
Weight	4.6 kg
	Dimensions and Cutout Required refer to Installation Instructions.

Fig. 1



Transistoren von der Anschlußseite gesehen
Transistors as seen from the connecting side
Transistors vus du côté des connexions



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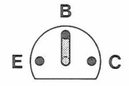
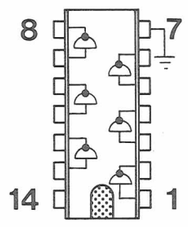


BC 172
BC 238 C

IC
von der Bestückungsseite gesehen
as seen from the top side
vu du côté éléments



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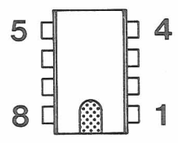

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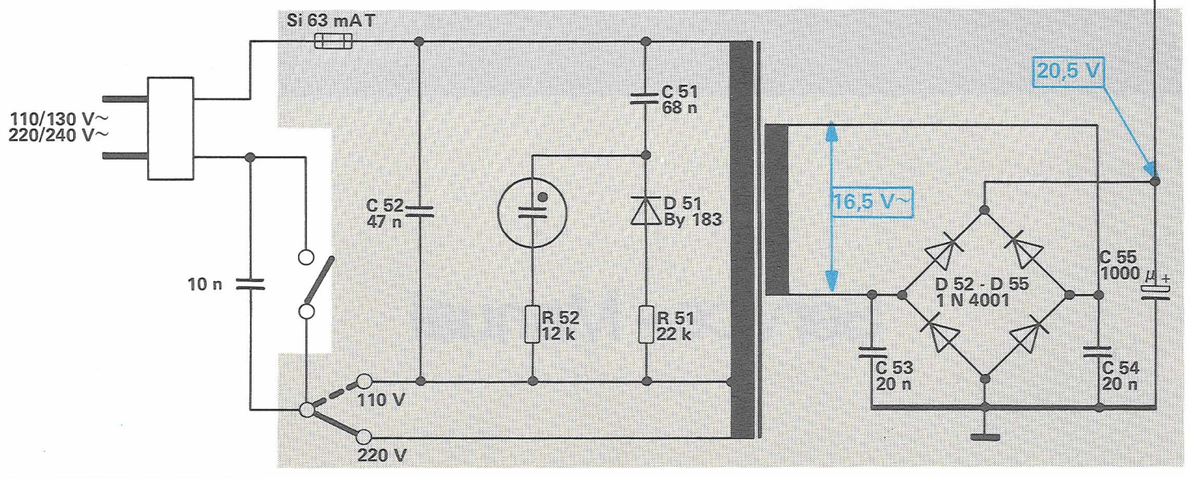

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Fig. 2 TA-Anschlußschema / Audio Connection Diagram / Schema de branchement / Esquema de conexion del fono captor

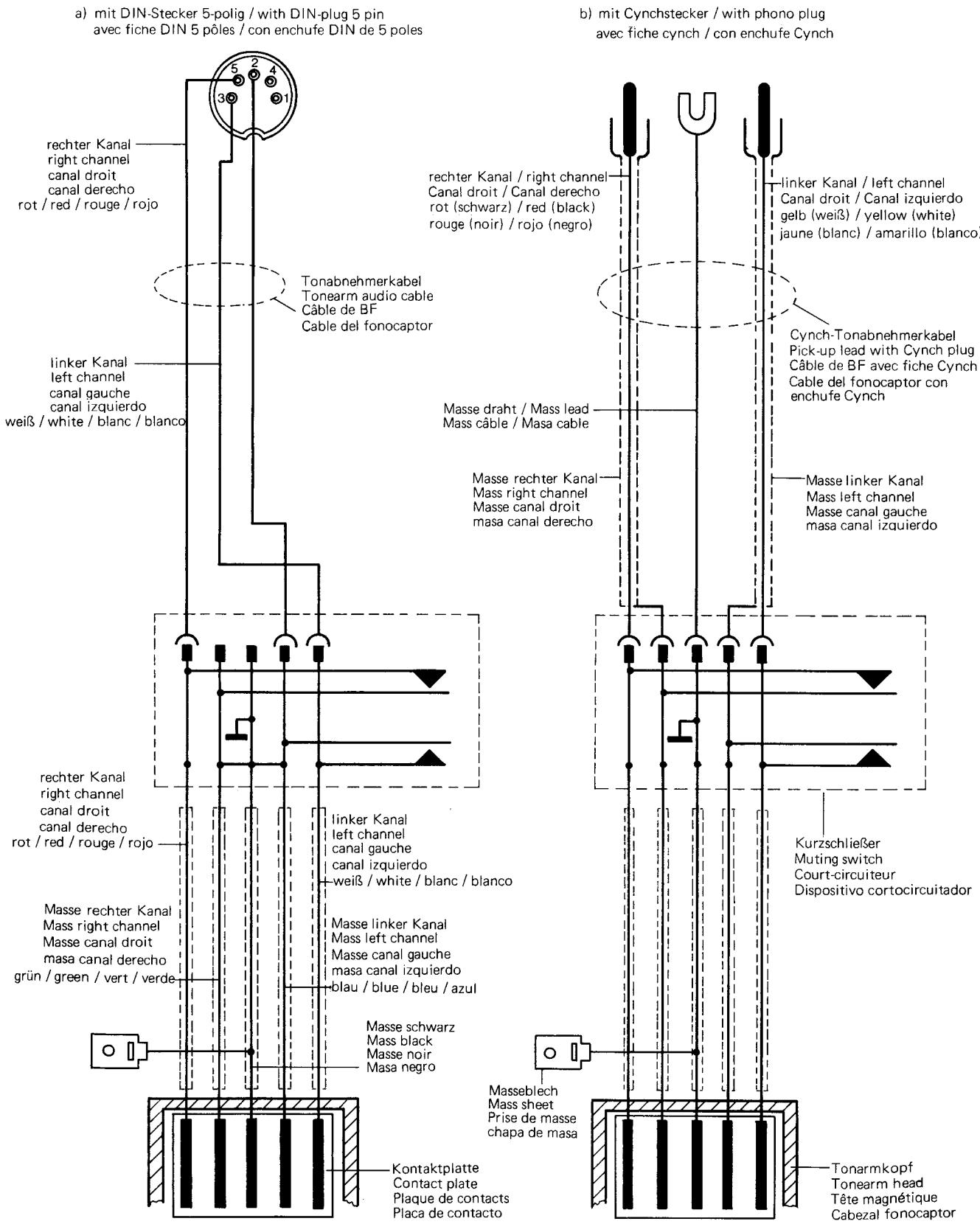
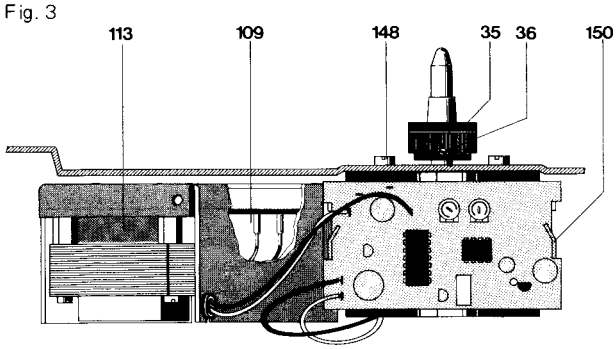


Fig. 3



Direct Drive System Dual EDS 500

For repair of the Dual EDS 500 special tools and measuring means are required. Work on the motor or motor electronics system should, therefore, only be carried out by an authorized Dual service station.

Removal

1. Extract unit plug from power line. Lift off platter (4). Bring unit into head position.
2. Remove machine screws (112) and cover of power part (113).
3. Unsolder connecting leads to motor and generator. Open twists of holding angle (150) with pliers. Remove motor electronics (152), screws (151) and holding angle (150).
4. Pull off motor electronics (152) system from motor (18) carefully.
5. Fix replacement motor electronics.
   Solder connecting cables (see connection diagram Fig. 4).
6. Slide cover over power part and fix it by means of machine screws (112).
7. With the unit in normal position connect it to power line. Switch on unit and check power consumption on operation:

   220 V/50 Hz approx. 15 mA
   110 V/60 Hz approx. 25 mA

   Check nominal speeds. If necessary, readjust as described below.

Replacement of Motor Mechanics

1. Extract unit plug from power line. Remove platter (4).
2. With the unit in head position remove machine screws (174) and washers (173). Pull off motor electronics board (172) together with cover (175) carefully from the motor (18).

Fig. 4

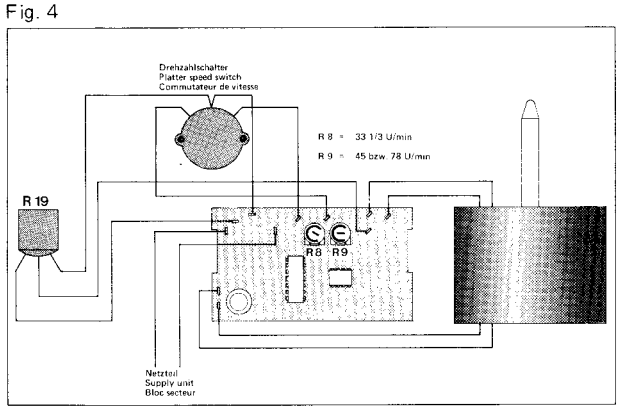
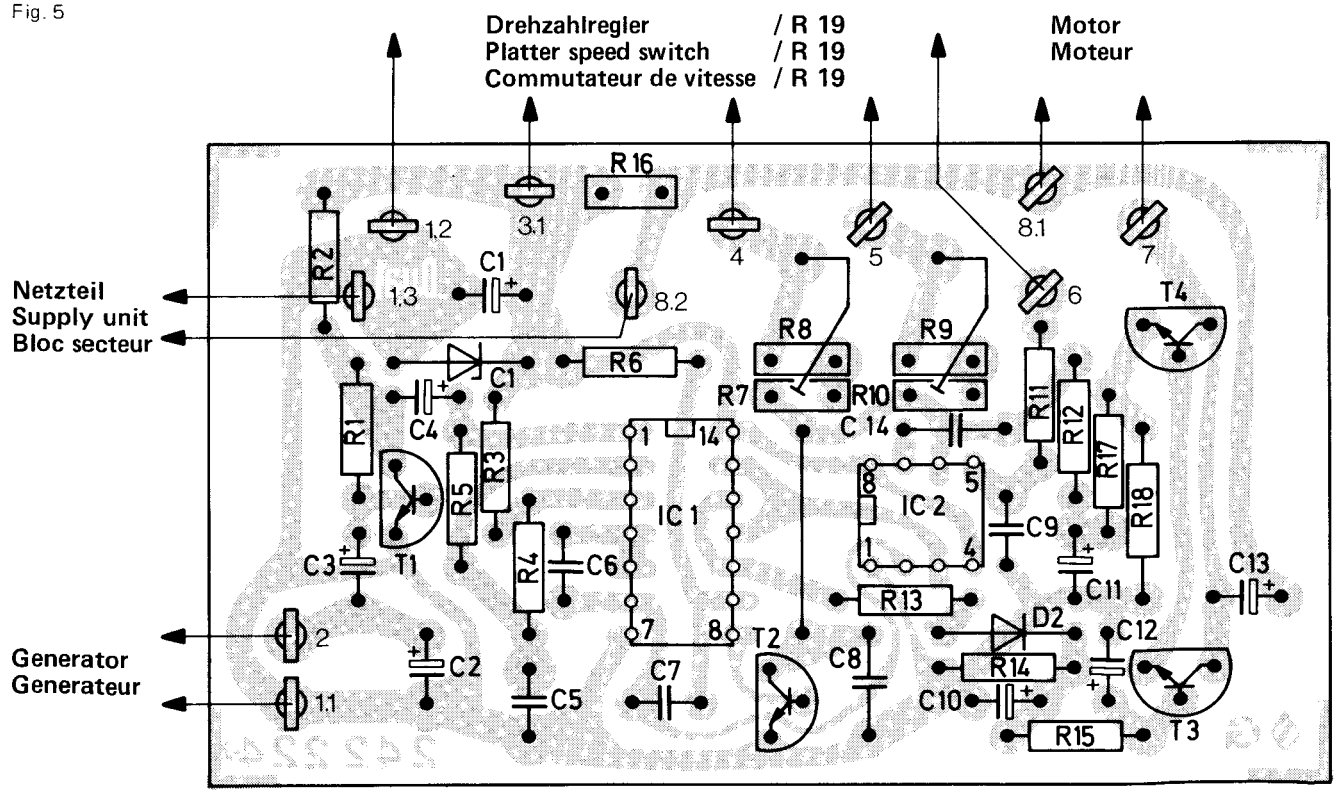


Fig. 5



3. Loosen connection for operating voltage at het plate (109). Unsolder connecting leads to speed fine adjustment (129), rotary switch (5) and the generator. Open twists of holding angle (152) with pliers.
4. Loosen threaded pins (36) and remove platter cone (35). Remove the three screws (148). Lift off motor mechanics (149).
5. Put platter cone (35) on new motor mechanics and fix it. Fix new motor mechanics with the three screws (148). Fix holding angle (150) with screws (151). Insert motor electronics (152) and twist holding pieces.
   Solder on resp. plug connecting leads (Fig. 4).
   Push cover on power part and fix it with screws (112).
6. With the unit in normal position connect it to the power line Switch on unit and check power consumption when operating:

   220 V/50 Hz approx. 15 mA
   110 V/60 Hz approx. 25 mA

   Check nominal speeds. If necessary, readjust as described below.

Setting nominal speeds

With knob (7) bring the fine speed control (129/R 19) into center position. With controls (R 8) and (R 9) on the motor electronic system adjust nominal speeds. Control (R 8) is used for 33 1/3 rpm, R 9 for 45 rpm. Check with strobe disk.

Changeover to 78 rpm nominal speed

Instead of 45 rpm the Dual 604 can be changed to a nominal speed of 78 rpm.
To change the speed bring the fine speed control (129/R 19) in center position using knob (7). Using control R 9 on the motor electronics board (172) adjust for 78 rpm. Check with strobe disk.

Stroboscope

Accurate setting of the platter speeds 33 1/3 and 45 rpm can be checked during play with the aid of the stroboscope.
When the platter (4) is rotating at exactly 33 1/3 or 45 rpm the lines of the stroboscope appear to stand still. If the lines move in the direction of rotation of the platter, the platter speed is too high. If the lines move backwards, the platter is rotating more slowly than the nominal speed. Adjustment of platter speeds 33 1/3 and 45 rpm is carried out separately with the "pitch" controls (7).

Strobe markings are provided on the outer edge of the platter for 50 and 60 Hz line frequencies.
To replace glow lamp (157) remove machine screws (160) and remove strobe cover (156).

It can happen that the stroboscope lines appear to move slightly although the exact speed setting with stroboscope stationary has not been altered. This apparent contradiction is explained by the fact that the electronic central drive motor operates fully independently of line frequency whilst the only relatively accurate line frequency of the AC current supply is used for speed measurement with the light stroboscope. The constantly detectable fluctuations of line frequency by ± 2 % according to the information of the electricity supply companies brief frequency fluctuations up to 1 % are possible – only effect the stroboscope indication and can cause the lines to "wander" although the platter speed is as constant and absolutely accurate as before.

Pitch Control

Each of the two standard speeds 33 1/3 and 45 rpm (78 rpm) can be varied by about 10 %. The variable speed control (129/R 19) located in the voltage divider is adjusted by turning the pitch control knob (7). By this the differential amplifier is altered and the motor speed accordingly.

Fig. 6

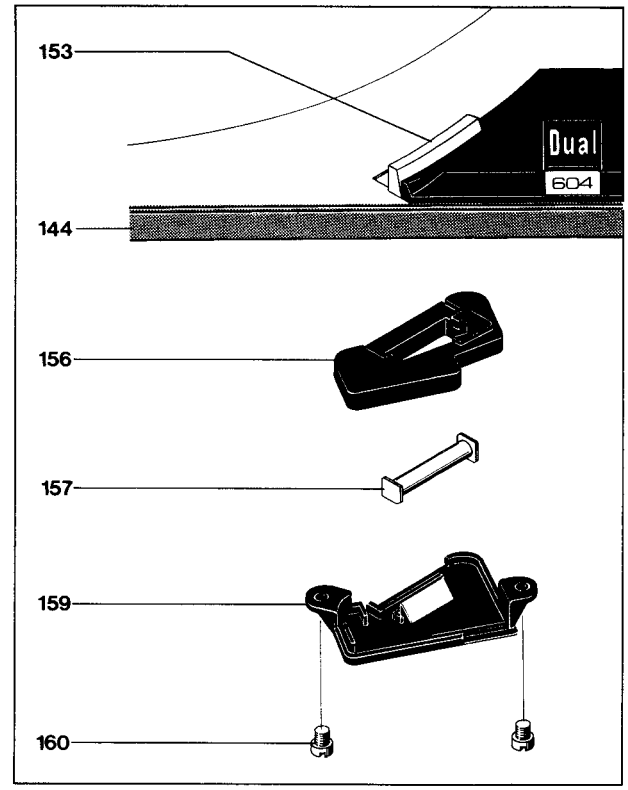


Fig. 7

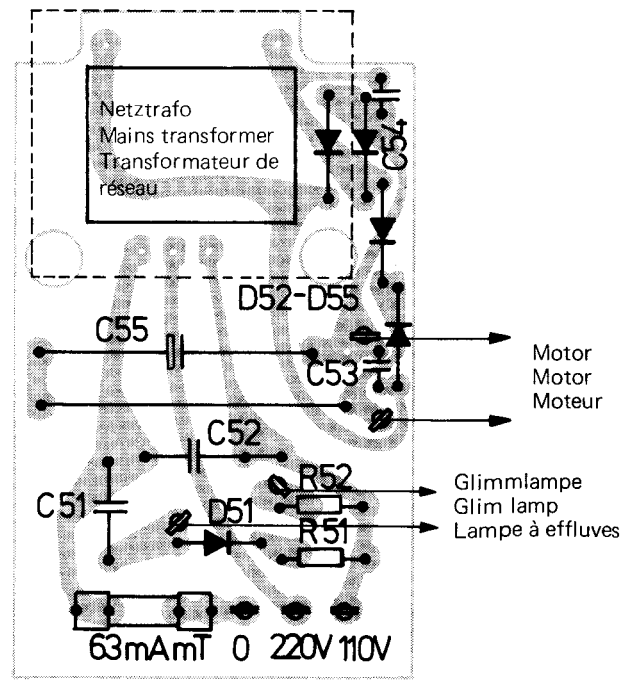
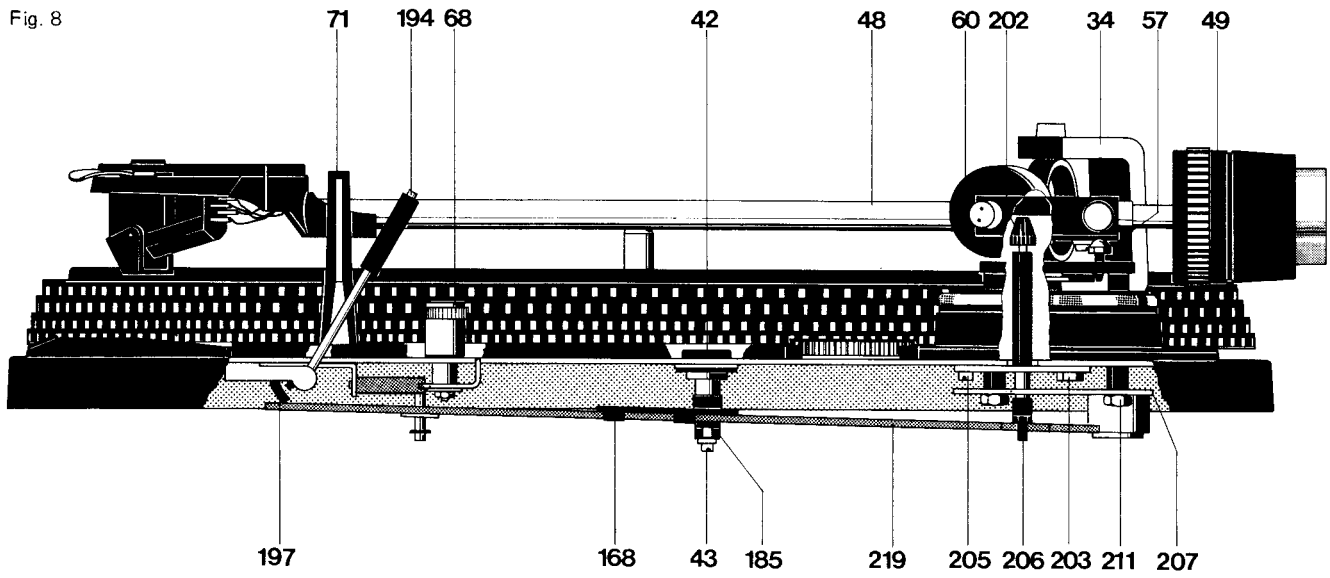


Fig. 8



Tonearm and Tonearm Suspension

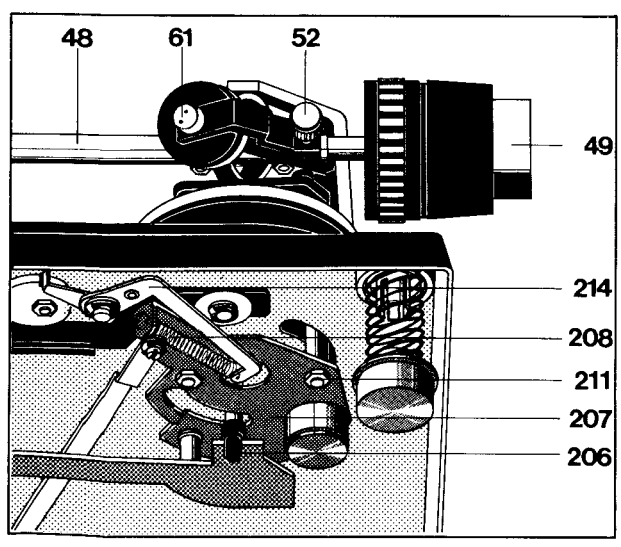
The feather-light, extremely torsion resistant all-metal tonearm is suspended in a gimbal. Suspension is by means of 4 hardened and precision polished steel points which rest in precision ball bearings. Tonearm bearing friction is thus reduced to a minimum.

Bearing friction vertical	0.07 mN	(0.007 p)
Bearing friction horizontal	0.16 mN	(0.016 p)

as related to stylus point.

As a result, it ensures most favourable pick-up conditions. Before adjusting the tracking force to suit the built-in pick-up cartridge the tonearm is balanced with the scale set to zero. Coarse adjustment is carried out by moving the weight with the stem (49), the subsequent fine adjustment by turning the weight. The balance weight is designed such that pick-up cartridges having a deadweight of 4.5 – 10 g can be balanced.
The tracking force is adjusted by turning the graduated spring housing (60) incorporating a coil spring. The scale has markings for a range of adjustment from 0 to 30 mN (0 to 3 p) which permit accurate adjustment of the tracking force. One graduation in the range of 2 – 15 mN (0.2 – 1.5 p) corresponds to 1 mN (0.1 p), in the range of 15 – 30 mN (1.5 – 3 p) to 2.5 mN (0.25 p).

Fig. 9



Removing the tonearm from the bearing frame

We recommend the following procedure:

1. Clamp unit in the repair stand. Set spring housing scale (60) to zero. Lock tonearm (48). Remove weight (49).
2. Turn unit over and remove the screening sheet (140). Unsolder the tonearm connections on the muting switch (137).
3. Remove safety washer (187), washer (186) and bearing (185). Move positioning bar (219) towards muting switch (137).
4. Unlock tension spring (208), loosen safety washer (215) and remove skating lever (214).
5. Remove safety washer (212) and sliding washer (210) and take shut-off bar (161) from segment.
6. Remove hex nuts (210) and segment (207).
7. Hold tonearm (48). Remove hex nut (203) and tonearm cpl. with tonearm bearing.

Reverse this procedure when reassembling.

Removal of tonearm assembly with tonearm bearing

1. Secure unit in repair jig. Remove weight (49) and undo fixing screw (52). Set tracking force scale (60) to zero.
2. Move unit into head position. Remove screening plate (140). Unsolder tonearm connecting on muting switch (137).
3. Move unit into normal position. Remove both mounting screws – SW 4.5 (54).

   For installation proceed in the reverse order.

Replacing spring housing

Remove tonearm (48) from bearing frame (51) as described above. Loosen lock nut (55) and threaded pin (56). Unscrew bearing screw (61). Lift bearing frame (59). Remove spring housing (60). When installing note that the helical spring catches the bearing frame. Slide in washer (60) and tighten bearing screw (61). Reinstall tonearm (48). Set bearing play as described below using threaded pin (56) and lock nut (55).

Adjusting the tonearm bearing

First balance tonearm exactly. Both bearings must have slight, just perceptible play. The horizontal tonearm bearing is correctly adjusted when at anti-skating settings "0.5" and being touched it slides in without resistance. The vertical tonearm bearing is correctly adjusted when it swings in after being touched. The play of the horizontal tonearm bearing should be adjusted with threaded pin (33) and mat of the vertical tonearm bearing with threaded pin (56).

Anti-skating Device

To compensate for skating force use the knurled ring (66). The asymmetric cam plate (217) displaces the skating lever (214) from the tonearm pivoting point. The anti-skating force is transmitted to the segment (207) and to the tonearm (48) by tension spring (209).
Optimum adjustment is carried out at the works for styli having a tip radius of 15 µm (conical), 5/6 and 18/22 µm (elliptical), and CD 4-cartridges.
Any alteration can only be carried out with the aid of a Dual-Skate-0-Meter and a test record and should only be done by an authorized service station.

Recheck as follows:

Balance tonearm (48) correctly. Set knurled ring (66) to 0. The tonearm should remain at any desired point within its turning range. The hole of the skating lever (214) should be in alignment with the center line of the tonearm. Adjustment is made by the eccentric pulley (E) which is accessible through the hole in the installation plate (23) between the knurled ring (68) and the tonearm.
Then set knurled ring (66) to "0.5". The tonearm should now smoothly rotate from the platter center to its rest (71).

Cue Control

By moving the lever (194) forward (▼) lift cam (197) rotates. The slide bar (219) connected to it transmits this movement to the lift pin (206) (via the compensating cam which then raises the tonearm. As a result, the cue control permits setdown of the tonearm at any desired point.
The lever (194) is released by moving the cue control lever rearwards (▼). As a result of the action of compression spring (204) the lift pin (201) is brought back to its normal position and the tonearm lowered slowly. Lowering of the tonearm is damped by silicone oil in the lift tube.

Adjustment Point

The lift height may be varied by turning the sleeve (202). The distance between the record and the needle is to be 5 - 7 mm with the tonearm (48) having a height play of 1 - 2 mm . Make adjustment by means of set screw (57).

Replacement of Cue Control Plate

Replace cue control plate (201) as follows:

1. Clamp unit in the repair stand and lock tonearm. Turn unit over.
2. Remove safety washer (187), washer (186) and bearing (185). Lift positioning bar (219) and move towards muting switch (137).
3. Unlock tension spring (208). Loosen safety washer (215) and lift skating lever (214). Remove safety washer (213) and sliding bar (212). Lift shut-off bar (161) from segment (207).
4. Remove hex nuts (211) and segment (207).

Fig. 10

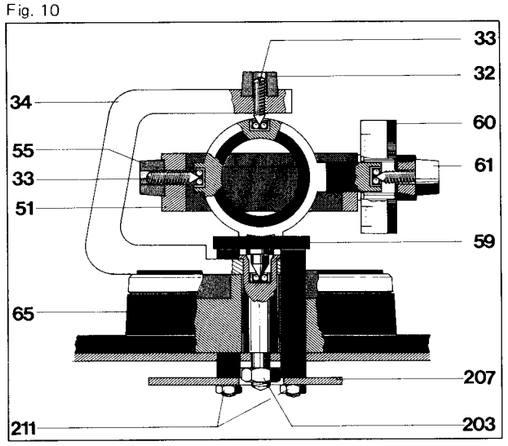


Fig. 11

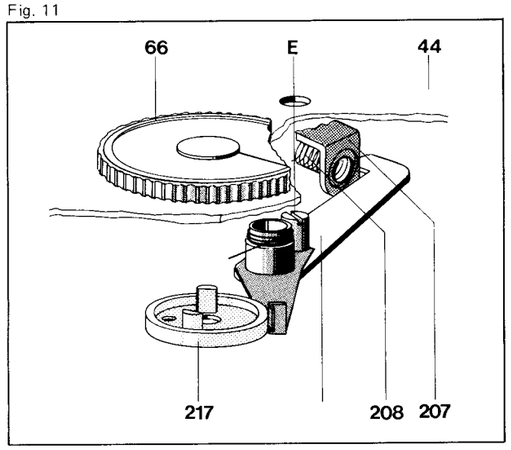
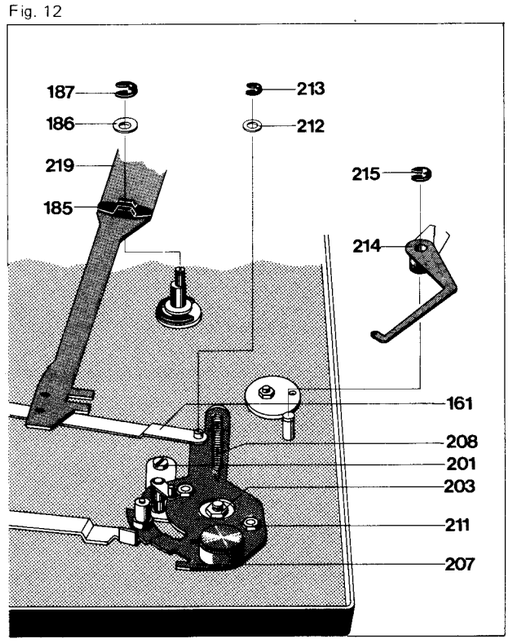


Fig. 12



5. Remove machine screws (205). Hold tonearm bearing. Unscrew hex nut (203) and remove lift plate (201).
6. Secure tonearm with hex nut (203) against falling out.

Reverse this procedure when reassembling.

Tonearm set-down mechanism

When turning knob (68) to "V" position the recesses of slide bar (219) are positioned in the area of the spring pin (F) of segment (207).
When moving slowly the tonearm with tonearm cue control in ▼ position the spring pin (F) is arrested in the recesses of slide bar (217) thus designing the set-down point of stylus for 30 cm and 17 cm records.
To enable set-down in the catching range of the arresting point of the appropriate setdown position, the tonearm set-down mechanism can be disengaged with the knob (68) in "–" position.

Adjustment Points

a) Balance tonearm (48) exactly. Bring knob (68) into " " position. Let tonearm catch in catch point for tonearm set-down point. Check catch force by means of a spring balance. It should read 10 – 20 p. The force is adjustable by means of a threaded pin.

b) The tonearm set-down point can be adjusted by turning set screw (42). Adjustment can be made for 17-cm- and 30-cm records.

Short Circuiter

To prevent disturbing noises during automatic operation of the tonearm the unit is fitted with a short circuiter. Control of the switch springs for both channels is effected by the camwheel. With the unit in neutral state the short circuit of the pick-up leads is eliminated.

Adjustment

In zero position of the cam there should be a clearance of approximately 0.5 mm between the contacts of the short circuiter. This clearance should be adjusted by bending the short circuit contact. The contacts should be sprayed with a suitable cleaning agent.

Starting and shut off

Swinging in the tonearm (48) rotates the segment (207) thus actuating the power switch (116) and shift arm (146) and starting motor (149) and platter (4) rotating.
The shut-off cycle after playing a record is initated by the dog (M) of the platter (4) and shut-off lever (A).
The shut-off lever (A) is guided onto the dog by the movement of the tonearm when playing the record with the aid of the shut-off bar (161) proportionate to the groove lead (Fig. 13 a). The eccentrically-mounted dog forces the shut-off lever (A) back with each revolution as long as the advance of the tonearm only amounts to the width of one groove.
The cam wheel (37) is thus guided to the pinion range of the platter. The tonearm is lifted and the resetting bar (188) transports it back to the rest. The power switch is operated, thus switching the unit off.

Fig. 13

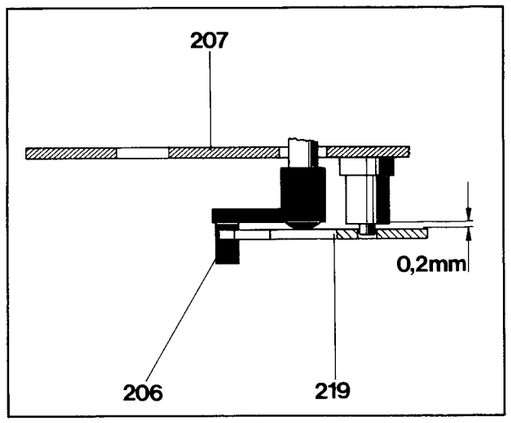


Fig. 14

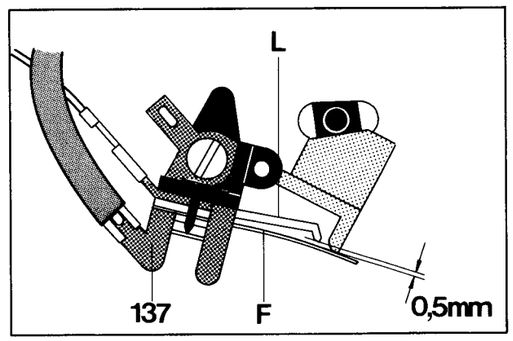
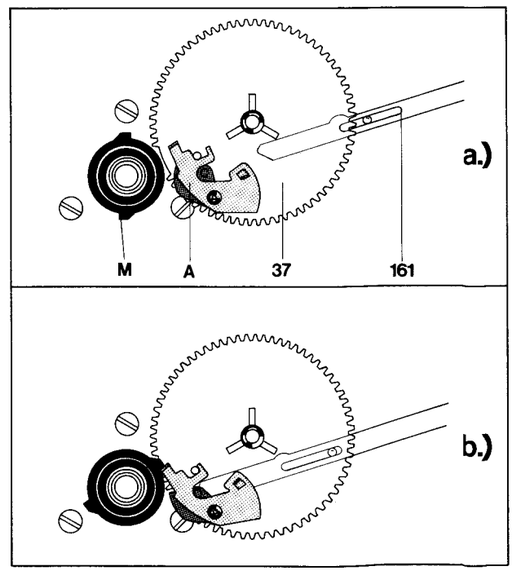


Fig. 15



Adjustment Points

1. **Segment**

a) When fixing the segment (207) mowe surt here is a play between the segment (207) and the switch lever (144) of 0.5 mm

b) The shut-off point may be varied with the eccentric (E) mounted on the segment (Fig. 16).

2. **Power Switch**

Swing in tonearm (48) slide (117) of power switch (116) should have a play of 0,2 – 0,5 mm. Make adjustments by bending the switch lever (144).

Fig. 16

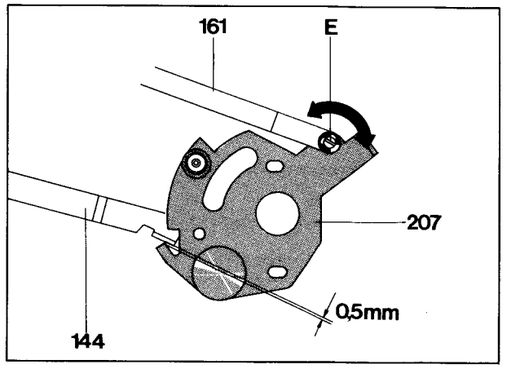


Fig. 17

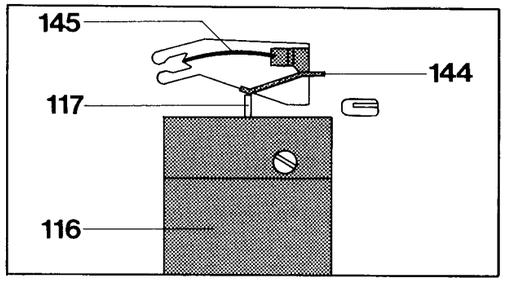
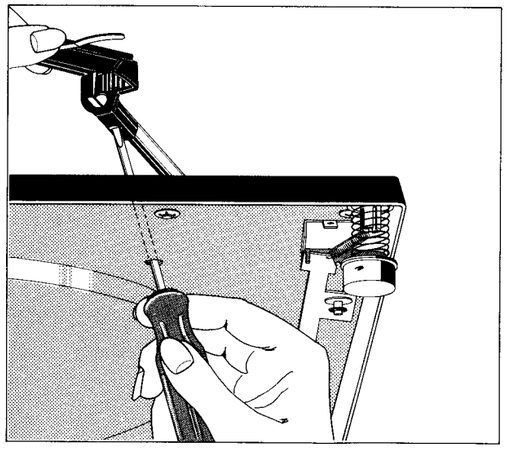


Fig. 18



Defect

Tonearm head not parallel to platter.

Cause

Seat of tonearm head on the tonearm tube has changed during transit.

Remedy

Remove platter. Insert screwdriver through the hole in the chassis mounting plate and loosen screw at tonearm head. Align tonearm head and retighten screw (Fig. 18).

Defect	Cause	Remedy
Stylus slips out of playing groove	a) Tonearm is not balanced	a) Balance tonearm
	b) Tonearm tracking force is too low	b) Adjust tracking force to the value stated by the cartridge manufacturer
	c) Anti-skating setting incorrect	c) Correct anti-skating setting
	d) Stylus tip worn or chipped	d) Renew stylus
	e) Excessive bearing friction in tonearm bearing	e) Check tonearm bearings and readjust if necessary
	f) Steel ball (162) of shut-off bar (161) missing	f) Renew steel ball (136)

Defect	Cause	Remedy
Tonearm does not set down on record or lowers too quickly when operating the cue control lever (197).	Excessive or insufficient damping as a result of contamination of the silicone oil in the lift tube.	Referring to page remove cue control plate (201). Remove adjustment bush sleeve (202). Remove lift pin (204) and compression spring (203). Clean lift tube and lift pin. Smear lift pin evenly with "Wacker Silicone Oil AK 300 000". Reassemble components.
With tracking force and anti-skating in 0 position tonearm moves outwards or inwards.	a) Anti-skating device maladjusted	a) Readjust anti-skating device as described on pages 11/12
	b) Tight tonearm leads cause a torque	b) Slacken leads
Motor does not switch off when tonearm sets down on rest.	Capacitor type suppressor (110) in power switch is defective (short-circuit).	Replace capacitor type suppressor in power switch.
Acoustic feedback	a) Chassis components (e.g. connecting leads) rubbing on board cut out.	a) Line up mounting board cut-out according to installation instructions. Remove leads.
	b) Connecting leads fixed too strongly	b) Loosen or lengthen leads.

Replacement part

Pos.	Part.No.	Qty.	Description	
1	220 213	1	Centering disc	
2	214 054	1	Washer	
3	244 460	1	Platter sandwich compl.	
4	244 461	1	Platter compl. with mat	
5	238 034	1	Rotary switch compl.	
6	242 184	1	Rotary knob	
7	242 189	1	Rotary knob	
8	242 181	3	Threaded pin M 3 x 3	
9	244 462	1	Pitch cover	
10	200 444	3	Spring washer	
11	239 414	3	Shipping screw compl.	
17	232 975	3	Spring mount compl. (Transformer side/Tonearm side back)	
	237 228	1	Spring mount compl. (Tonearm side front)	
18	230 529	4	Threaded piece	
19	230 523	3	Compression spring (Transformer/Tonearm side back)	
	236 712	1	Compression spring (Tonearm side front)	
20	200 723	4	Rubber damping	
21	200 722	4	Steel cup	
25	244 463	1	Tonearm head compl.	
26	237 223	1	Contact plate compl.	
27	234 611	1	Handle	
28	210 182	1	Lock washer	4.2/8
29	210 630	1	Washer	4.2/8/0.5
30	210 197	1	"C" clip	
31	236 242	1	Holder	TK 24
32	234 635	2	Lock nut	
33	230 063	1	Threaded pin	
34	237 230	1	Frame compl.	
35	242 192	1	Platter cone compl.	
36	242 191	3	Threaded pin	M 3 x 3
37	244 464	1	Cam wheel cpl.	
38	210 146	4	Lock washer	3.2
39	242 143	1	Tension spring	
40	210 145	5	Lock washer	2.3
41	242 141	1	Contact lever	
42	234 781	1	Adjustment screw	
43	234 818	1	Pin screw	
44	244 465	1	Mounting plate	
48	244 466	1	Tonearm compl.	
49	244 467	1	Weight compl.	
50	239 741	1	Pointer	
51	244 468	1	Bearing frame compl.	
52	236 051	1	Clamp screw	
53	244 244	2	Washer	3.5/6/1.5
54	244 103	2	Hexagon sheet screw	2.9 x 6.5

Pos.	Part.No.	Qty.	Description	
55	234 635	2	Stop nut	
56	234 634	1	Threaded pin	
57	242 131	1	Adjustment screw	
59	237 234	1	Bearing compl.	
60	236 907	1	Spring housing compl.	
61	234 637	1	Bearing screw	
65	244 470	1	Cover back compl.	
66	236 081	1	Ring	
67	200 444	2	Spring washer	
68	240 151	1	Rotary knob	
69	244 471	1	Cover front compl.	
70	200 444	3	Spring washer	
71	244 472	1	Support compl.	
72	210 362	1	Hex nut	BM 3
101	210 517	2	Machine screw	M 4 x 10
102	210 648	2	Washer	4.2/14/1
103	242 283	2	Bushing	
104	209 939	2	Sleeve	
105	210 480	4	Machine screw	AM 3 x 6
106	237 548	2	Sleeving with strain relief	
107	228 209	1	Sleeve	
108	242 284	1	Insulating plate	
109	244 473	1	Power plate compl.	
110	242 478	1	Fuse	T 0,063 A
C 51	225 322	1	Foil	68 nF/400 V/10 %
C 52	224 886	1	Paper	67 nF/250 V/20 %
C 53	222 760	2	Ceramic	20 nF/ 50 V
C 54	222 760	2	Ceramic	20 nF/ 50 V
C 55	226 686	1	Elyt	1 000 µF/ 40 V
D 51	225 247	1		BY 183/300
D 52	227 344	4		1 N 4001
D 53	227 344	4		1 N 4001
D 54	227 344	4		1 N 4001
D 55	227 344	4		1 N 4001
R 51	232 402	1	Carbon	22 kΩ /0,25 W/5 %
R 52	232 401	1	Carbon	12 kΩ /0,125 W/5 %
111	244 474	1	Power transformer compl.	
112	210 283	2	Fillister sheet screw	
113	244 475	1	Power part compl.	
116	242 581	1	Power switch compl.	
117	236 335	1	Slide	
118	200 444	1	Spring washer	
119	233 012	1	Switch plate compl.	
120	219 200	1	Snab spring	
121	239 732	1	Tension spring	
122	230 148	1	Switch angle	

Fig. 19 Exploded view 1

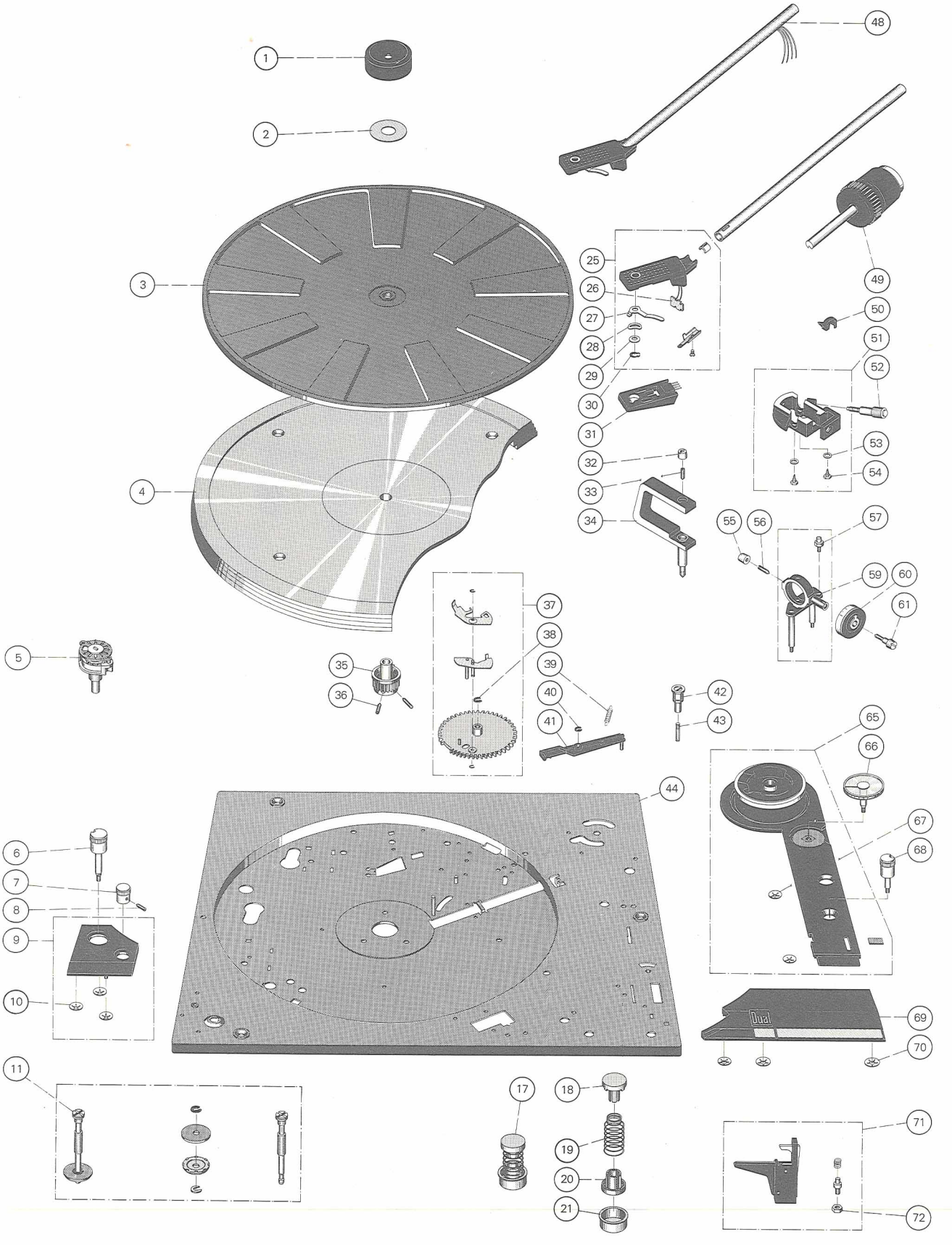
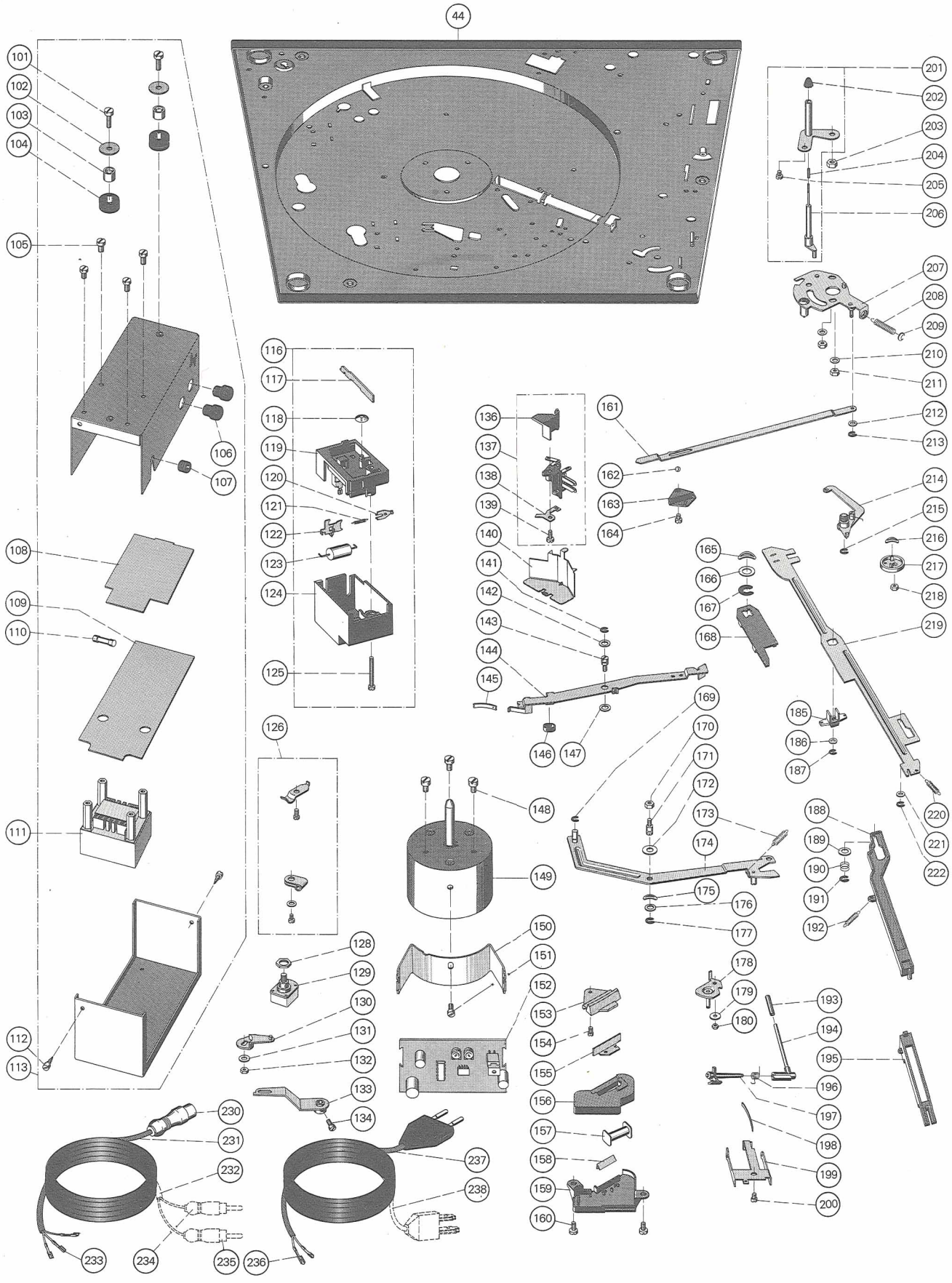


Fig. 20 Exploded view 2



Pos.	Part.No.	Qty.	Description	
123	241 883	1	Capacitor	10 nF/250 V
124	242 102	1	Cap	
125	210 498	1	Machine screw	M 3 x 28
126	231 079	1	Cable holder compl.	
128	237 782	1	Nut for potentiometer	
129	238 073	1	Fine speed control (R)	
130	242 195	1	Switch unit	
131	210 587	1	Washer	3.2/7/1
132	210 362	1	Hex nut	BM 3
133	242 187	1	Switch member	
134	210 469	1	Machine screw	AM 3 x 3
136	242 182	1	Contact arm	
137	242 612	1	Short circuiter compl.	
138	239 806	1	Base sheet	
139	210 486	1	Machine screw	AM 3 x 8
140	239 808	1	Screening sheet	
141	210 146	1	Lock washer	3.2
142	210 630	1	Washer	4.2/8/0.5
143	234 759	1	Screw pin	
144	242 142	1	Switch lever	
145	242 144	1	Spring	
146	242 145	1	Silicone tubing	
147	210 630	1	Washer	3.2
148	210 511	3	Machine screw	AM 4 x 4
149	244 476	1	Motor mechanics compl.	
150	242 233	1	Stop angle	
151	210 511	1	Machine screw	AM 4 x 4
152	244 477	1	Motor electronics compl.	
153	242 160	1	Stroboscope trimplate	
154	210 469	1	Machine screw	AM 3 x 3
155	242 158	1	Angle reflector	2
156	237 677	1	Bottom part of housing	
157	225 321	1	Lamp	
158	242 201	1	Angle reflector	1
159	237 679	1	Stroboscope cover	
160	210 472	2	Machine screw	AM 3 x 4
161	242 179	1	Stop lever	
162	209 357	1	Ball	ϕ 3.2
163	232 104	1	Ball bed	
164	210 472	1	Machine screw	AM 3 x 4
165	234 782	1	Lock washer	
166	210 713	1	Washer	9.1/15/1
167	210 151	1	Lock washer	7
168	242 180	1	Plate	
169	210 145	1	Lock washer	
170	210 366	1	Hex nut	M 4
171	242 175	1	Screw pin	
172	210 607	1	Washer	3.2/10/0.5
173	233 710	1	Tension spring	
174	242 171	1	Lever	
175	210 182	1	Lock washer	
176	210 630	1	Washer	4.2/3/0.5
177	210 146	4	Lock washer	3.2
178	242 164	1	Rotary lever	
179	203 477	1	Washer	2.7/8/1
180	210 353	1	Hex nut	M 2
185	234 784	1	Bearing	
186	210 586	1	Washer	3.2
187	210 145	5	Lock washer	2.3
188	242 165	1	Rail	
189	242 166	1	Washer	3.2/14/0.5
190	243 001	1	Compression spring	
191	210 145	5	Lock washer	2.3
192	242 167	1	Tension spring	
193	237 543	1	Rubber sleeve	
194	239 547	1	Handle	
195	242 161	1	Lift rail	
196	234 778	1	Spring	
197	234 777	1	Shift curve	
198	232 545	1	Spring	
199	234 776	1	Bearing lever	
200	210 469	1	Machine screw	AM 3 x 3
201	244 482	1	Lift plate compl.	
202	243 125	1	Adjustment bush	
203	210 366	1	Hex nut	

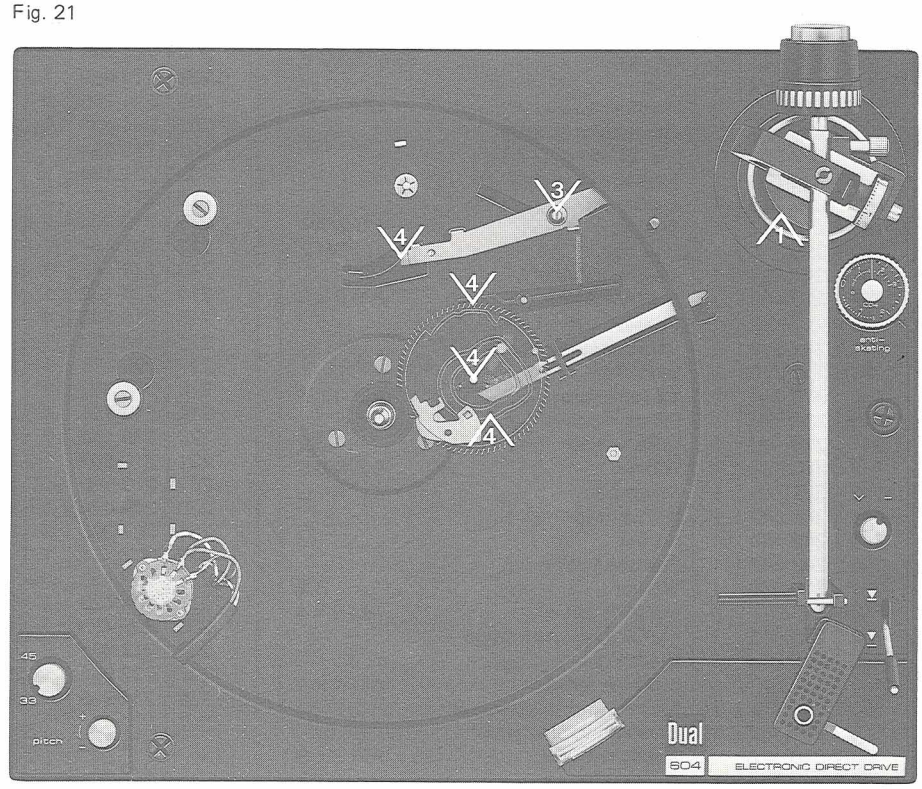
Pos.	Part.No.	Qty.	Description	
204	234 798	1	Compression spring	
205	210 469	1	Machine screw	AM 3 x 3
206	234 795	1	Lift pin	
207	244 481	1	Segment compl.	
208	218 591	1	Tension spring	
209	201 184	1	Adjustment washer	
210	210 587	2	Washer	3.2/7/1
211	210 362	2	Hex nut	M 3
212	201 187	1	Washer	
213	210 145	5	Lock washer	2.3
214	238 192	1	Skating lever compl.	
215	210 146	4	Lock washer	3.2
216	216 867	1	Lock washer	5.2/10
217	225 176	1	Curve washer	
218	210 362	1	Hex nut	M 3
219	242 181	1	Adjustment lever	
220	235 152	1	Tension spring	
221	210 607	1	Washer	3.2
222	210 145	5	Lock washer	2.3
230	209 424	1	5pole plug	
231	207 303	1	Pick-up-cable compl.	
232	207 301	1	Pick-up-cable compl.	
233	209 436	3	Falt connector sleeve	
234	209 425	1	Cynch plug white	
235	209 426	1	Cynch plug black	
236	214 602	2	AMP connector sleeve	
237	232 996	1	Power cable europe compl.	
238	232 995	1	Power cable america compl.	
	214 120	1	Distance roll and screws for pick-up mounting	
	244 347	1	Mounting instructions	
	242 713	1	Operating instructions	
	242 694	1	Operating instructions UAP	
	242 718	1	Shipping carton	
			Motor electronic	
C 1	220 766	4	Elyt	47 µF/ 25 V
C 2	224 597	1	Elyt	220 µF/ 6 V
C 3	216 410	3	Elyt	470 nF/ 35 V/10 %
C 4	216 410	3	Elyt	470 nF/ 35 V/10 %
C 5	227 963	1	Ceramic	10 nF/ 30 V/20 %
C 6	227 390	2	Ceramic	1 nF/ 63 V/20 %
C 7	227 390	2	Ceramic	1 nF/ 63 V/20 %
C 8	222 499	1	Foil	0,22 µF/100 V/ 5 %
C 9	222 760	1	Ceramic	20 nF/ 50 V
C 10	216 410	3	Elyt	470 nF/ 35 V/10 %
C 11	235 573	1	Elyt	10 µF/ 16 V
C 12	242 314	1	Elyt	0,68 µF/ 35 V
C 13	220 766	4	Elyt	47 µF/ 25 V
C 14	226 459	1	Foil	0,1 µF/100 V/ 5 %
D 1	227 360	1		ZPD 7,5
D 2	223 906	1		1 N 4148
R 1	224 603	3		1 MΩ/0,25 W/5 %
R 2	211 202	4		10 kΩ/0,25 W/5 %
R 3	224 735	1		68 kΩ/0,25 W/5 %
R 4	239 387	1		22 kΩ/0,25 W/5 %
R 5	224 603	3		1 MΩ/0,25 W/5 %
R 6	241 342	1		82 kΩ/0,25 W/5 %
R 7	242 307	1	Potentiometer	47 kΩ
R 8	243 616	1		10 kΩ/ lin.
R 9	243 617	1		22 kΩ/ lin.
R 10	245 531	1	Potentiometer	24 kΩ
R 11	227 384	1		110 kΩ/0,125 W/5 %
R 12	228 265	1		270 kΩ/0,25 W/5 %
R 13	239 395	1		15 kΩ/0,25 W/5 %
R 14	224 590	1		220 kΩ/0,25 W/5 %
R 15	211 202	4		10 kΩ/0,25 W/5 %
R 16	217 868	1		560 Ω/0,3 W/5 %
R 17	239 367	1		47 kΩ/0,25 W/5 %
R 18	242 311	1		2 Ω/25 W/5 %
T 1	229 511	2		BC 172 B
T 2	229 511	2		BC 172 B
T 3	244 715	1		BC 238 C
T 4	242 306	1		BD 415
IC 1	242 303	1		NS 4069
IC 2	242 304			NS 555

Alterations reserved!

Lubrication

All bearings and friction points are adequately lubricated by the manufacturer. Replenishment of oil and grease is only necessary after approximately 2 years of normal use of the turntable as the most important bearing points (motor bearings) have sintered metal bushes.
Bearing points and friction faces should be lubricated sparingly rather than generously.
When using different lubricants, chemical decomposition can often occur. To prevent failure of lubrication we recommend using the original lubricants stated below.

Fig. 21

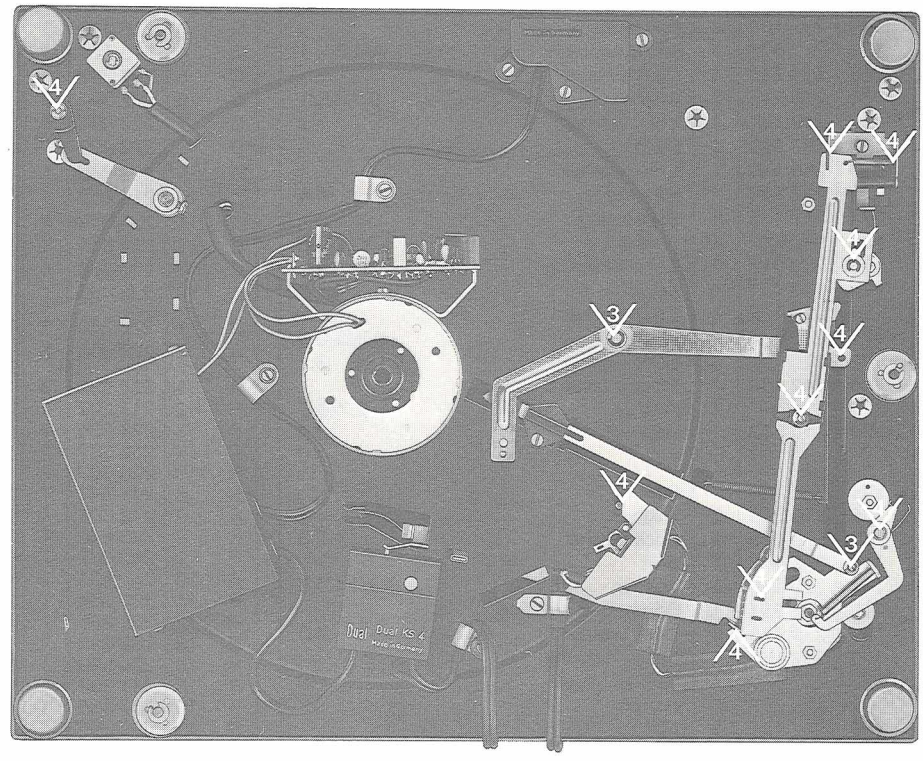


Wacker Silicone oil
AK 500 000

BP Super Viskostatik
10 W/30

Shell Alvania No. 2

Fig. 22



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